

--82. A method of identifying one or more nucleic acid molecules, comprising:

- a) contacting at least one probe nucleic acid molecule that comprises a known or suspected SNP or mutation with a survey population of nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate a probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules;
- b) treating said probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules with a nucleolytic activity, such that nucleolytic activity-sensitive nucleic acid molecules are digested, to generate a population of nucleolytic activity-protected nucleic acid molecules;
- c) contacting said population of nucleolytic activity-protected nucleic acid molecules with a solid support comprising one or more attached nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes; and
- d) identifying one or more of said attached nucleic acid molecules or one or more of said nucleolytic activity-protected nucleic acid molecules in one or more attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes.

83. The method of claim 82, wherein said survey population comprises RNA.

84. The method of claim 82, wherein said survey population comprises DNA.

85. The method of claim 82, wherein said known or suspected SNP or mutation is at a terminus of said probe.
86. The method of claim 82, wherein said known or suspected SNP or mutation is not at a terminus of said probe.
87. The method of claim 82, wherein said at least one probe comprises DNA.
88. The method of claim 82, wherein said nucleolytic activity comprises at least one nuclease.
89. The method of claim 88, wherein said at least one nuclease is a single-strand specific nuclease.
90. The method of claim 89, wherein said single-strand specific nuclease is S1 nuclease, Mung Bean nuclease, RNase T1, RNase A, or RNase H.
91. The method of claim 82, wherein solid support comprises glass, silicon, nylon, one or more polymers, one or more plastics, one or more ceramics, or one or more metals.
92. The method of claim 91, wherein said solid support is an array.
93. The method of claim 82, wherein said one or more attached nucleic acid molecules are at least partially complementary to said at least one probe nucleic acid molecule.
94. The method of claim 82, wherein said known or suspected SNP or mutation occurs at the unattached 3' terminus of said one or more attached nucleic acid molecules.
95. The method of claim 82, wherein said identifying comprises labeling said attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes with at least one detectable label.
96. The method of claim 95, wherein said labeling uses at least one polymerase.

97. A method of identifying one or more nucleic acid molecules, comprising:

- a) contacting at least one probe nucleic acid molecule with a survey population of nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate a probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules;
- b) treating said probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules with a nucleolytic activity, such that nucleolytic activity-sensitive nucleic acid molecules are digested, to generate a population of nucleolytic activity-protected nucleic acid molecules;
- c) contacting said population of nucleolytic activity-protected nucleic acid molecules with one or more particles comprising one or more attached nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes; and
- d) identifying one or more of said attached nucleic acid molecules or one or more of said nucleolytic activity-protected nucleic acid molecules in one or more attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes by labeling said attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes with at least one detectable label using at least one polymerase.

98. The method of claim 97, wherein said one or more particles is paramagnetic.

99. The method of claim 97, wherein said one or more particles comprises one or more polymers.

100. The method of claim 99, wherein at least one of said one or more polymers is polystyrene, polycarbonate, polyvinylchloride, polypropylene, polyacrylamide, sepharose, agarose, cellulose, or dextran.

101. A method of identifying one or more nucleic acid molecules, comprising:

- a) contacting at least one probe nucleic acid molecule with a survey population of nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate a probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules;
- b) treating said probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules with a nucleolytic activity, such that nucleolytic activity-sensitive nucleic acid molecules are digested, to generate a population of nucleolytic activity-protected nucleic acid molecules;
- c) amplifying said population of nucleolytic activity-protected nucleic acid molecules;
- d) contacting said population of nucleolytic activity-protected nucleic acid molecules with a solid support comprising one or more attached nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes; and
- e) identifying one or more of said attached nucleic acid molecules or one or more of said nucleolytic activity-protected nucleic acid molecules in one or more attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes.

102. The method of claim 101, wherein said amplification uses a DNA polymerase or an RNA polymerase.

103. The method of claim 102, wherein said amplification uses a DNA polymerase.

104. The method of claim 103, wherein said DNA polymerase is DNA polymerase I, Klenow fragment, *T. aquaticus* polymerase, or T4 DNA polymerase.

105. The method of claim 102, wherein said amplification uses an RNA polymerase.

106. The method of claim 105, wherein said RNA polymerase is SP6 RNA polymerase or T7 RNA polymerase.

107. The method of claim 102, wherein said amplification is substantially linear.

108. A method of identifying one or more nucleic acid molecules, comprising:

- a) contacting at least one probe nucleic acid molecule with a survey population of nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate a probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules;
- b) treating said probe-survey population mixture of nucleic acid molecules that comprises one or more probe nucleic acid molecules hybridized to one or more survey population nucleic acid molecules with a nucleolytic activity, such that nucleolytic activity-sensitive nucleic acid molecules are digested, to generate a population of nucleolytic activity-protected nucleic acid molecules;
- c) contacting said population of nucleolytic activity-protected nucleic acid molecules with a solid support comprising one or more attached nucleic acid molecules under conditions that promote hybridization between nucleic acid molecules to generate attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes; and
- d) identifying one or more of said attached nucleic acid molecules or one or more of said nucleolytic activity-protected nucleic acid molecules in one or more attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes by labeling said attached nucleic acid molecule/nucleolytic activity-protected nucleic acid molecule complexes with at least one detectable label using at least one polymerase.

109. The method of claim 108, wherein said survey population comprises RNA.

110. The method of claim 108, wherein said survey population comprises DNA.

111. The method of claim 108, wherein said at least one probe comprises DNA.

112. The method of claim 108, wherein said nucleolytic activity comprises at least one nuclease.

113. The method of claim 112, wherein said at least one nuclease is a single-strand specific nuclease.

114. The method of claim 113, wherein said single-strand specific nuclease is S1 nuclease, Mung Bean nuclease, Rnase T1, RNase A, or RNase H.

115. The method of claim 108, wherein said solid support comprises glass, silicon, nylon, one or more polymers, one or more plastics, one or more ceramics, or one or more metals.

116. The method of claim 115, wherein said solid support is an array.
117. The method of claim 108, wherein said one or more attached nucleic acid molecules are at least partially complementary to said at least one probe nucleic acid molecule.
118. The method of claim 108, in which said at least one polymerase is one of the group comprising T4 DNA polymerase, *T. aquaticus* polymerase, Klenow fragment, DNA polymerase I, T7 RNA polymerase, SP6 RNA polymerase.
119. The method of claim 108, wherein said at least one detectable label comprises a radioisotope, a fluorochrome, an enzyme, or a specific binding member.
120. The method of claim 119, in which said at least one detectable label comprises at least one nucleotide.
121. The method of claim 120, wherein said at least one detectable label comprises at least two different nucleotides---